

WHAT IS CLAIMED IS:

1. A manufacturing method of a fiber coupler, comprising steps of:
  - (a) providing at least a first fiber and a second fiber and stacking said fibers together for forming a stacking region; and
  - (b) fusing said stacking region through an electric arc for forming said fiber coupler.
2. The method according to claim 1, wherein said step (a) further comprises steps of:
  - (a1) forming a first evanescent field exposed surface on said first fiber; and
  - (a2) stacking said first evanescent field exposed surface with said second fiber so as to form said stacking region.
3. The method according to claim 2, wherein said step (a1) further comprises a step of: forming a second evanescent field exposed surface on said second fiber.
4. The method according to claim 3, wherein said step (a2) further comprises a step of: stacking said first evanescent field exposed surface with said second evanescent field exposed surface fixedly together for forming said stacking region.
5. The method according to claim 3, wherein said first and said second evanescent field exposed surfaces respective of said first and said second fibers are formed by a polishing method.
6. The method according to claim 3, wherein said first and said second evanescent field exposed surfaces respective of said first and said second fibers are formed by a laser-paring method.
7. The method according to claim 1, wherein said step (b) further comprises a step of: cleaning said stacking region by said electric arc through adjusting a

temperature thereof before fusing said stacking region.

8. The method according to claim 1, wherein said step (b) further comprises a step of: surrounding said stacking region by a gas while fusing said stacking region.

9. The method according to claim 1, wherein said step (b) further comprises a step of: adjusting an elongation length of said stacking region while fusing said stacking region.

10. The method according to claim 1, wherein said step (b) further comprises a step of: annealing said stacking region through adjusting a temperature of said electric arc after fusing said stacking region.

11. A manufacturing apparatus of a fiber coupler having at least two fibers, comprising:

a pedestal;

at least a fixing unit located on said pedestal for fixedly stacking said at least two fibers together to form a stacking region; and

a discharging unit located on said pedestal for producing an electric arc,

wherein said stacking region is fused by said electric arc so as to form said fiber coupler.

12. The manufacturing apparatus according to claim 11, wherein said fixing unit is made of a material selected from a group consisting of a semiconductor material, a metal, a metal complex, a glass, a ceramics, and a macromolecular material.

13. The manufacturing apparatus according to claim 12, wherein said semiconductor material is a silicon.

14. The manufacturing apparatus according to claim 11, wherein said discharging unit is movable.

15. The manufacturing apparatus according to claim 11, wherein said discharging unit further comprises a pair of electrodes which are position adjustable.

16. The manufacturing apparatus according to claim 15, wherein said electrodes are made of a material selected from a group consisting of a tungsten, a molybdenum, a titanium, a tantalum, a chromium, a nickel, a vanadium, a zirconium, a hafnium, a platinum, a molybdenum disilicide, a tungsten carbide, a titanium diboride, a hafnium diboride, a hafnium carbide, a niobium, a niobium diboride, a niobium carbide, a tungsten disilicide, a stainless steel, and an alloy thereof.

17. The manufacturing apparatus according to claim 11, wherein said fixing unit further comprises a regulating element for adjusting an elongation length of said stacking region.

18. The manufacturing apparatus according to claim 17 further comprising a controller for controlling said regulating element and said discharging unit.